

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 26-32 are being added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-32 are now pending in this application.

Statement of Substance of Interview

Applicants wish to thank Examiner Lieu for conducting the interview on January 25, 2006. In accordance with the request in the Interview Summary of January 25, 2006, please be advised that the Interview Summary accurately summarizes the interview.

Rejection under 35 U.S.C. § 102

Claims 1, 2, 5-7, 18, and 19 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,289,281 (hereafter “Shinmura et al.”). This rejection is respectfully traversed for at least the following reasons.

This application regards an information providing apparatus for a vehicle that provides contact possibility information to a driver through deceleration control according to the possibility of the vehicle contacting an object in front of the vehicle. Contact possibility information gives the driver a perception of a change or correction in the driving force or braking force of the vehicle. By controlling driving force or braking force according to a possibility of the vehicle contacting an object, the apparatus detects a driver’s intention, corrects a control value of the driving force or braking force on the basis of the driver’s

intention, and provides contact possibility information to the driver without annoying the driver with an unnecessary warning.

In actual traffic conditions, a vehicle driver may intentionally bring a vehicle closer to an object in front of the vehicle while the driver remains ready for quick deceleration in order to avoid contact with the object in front of the vehicle. For example, the object may be another vehicle that is running in front of the driver's vehicle and obliquely to the driver's vehicle, wherein the driver intentionally changes lanes in order to drive behind the other vehicle. In such a situation it is preferable to suppress a warning operation because such a warning may be unnecessary and annoying to the driver. See page 1, line 24, to page 2, line 30, of the present application.

According to an embodiment, for example, the apparatus detects a lane change for the vehicle and then determines if an elapsed time since the lane change is within a predetermined time. See specification at page 9, line 16; page 11, lines 20-21. If the elapsed time is within a predetermined time, the apparatus modifies a threshold for providing contact possibility information so that timing for providing the contact possibility information is delayed. For example, in this embodiment the absolute collision time threshold THW_Th is given a value of Th_1 when the elapsed time is within the predetermined time. See specification at page 11, lines 26-30; page 12, lines 1-3, 11-14. The value of Th_1 is smaller than Th_0, which is the normal value for the absolute collision time threshold THW_Th. See specification at page 11, lines 7-10, 14-17. As shown in Figures 13A and 13B, the apparatus can calculate correction values for the driving force or braking force of the vehicle on the basis of a virtual member or spring 500. If an object comes within a distance to the vehicle that is shorter than the length of the virtual member 500, the virtual member 500 is compressed, creating a counter force that is determined by the apparatus. See specification at page 12, lines 27-30; page 13, lines 1-5. The absolute collision time threshold THW_Th can be used to calculate the length of a virtual member. See specification at page 13, lines 6-9. Therefore, if the absolute collision time threshold THW_Th is given a smaller value than its normal value, the length of a virtual member is shortened. Because the virtual member is shortened, a counter force is not created until a vehicle-to-object distance is reached that is smaller than a normal vehicle-to-object distance for initially creating a counter force. This

causes the effect of the counter force (providing contact possibility information) to be delayed due to the modification of the absolute collision time threshold THW_Th. See specification at page 22, lines 28-30; page 23, lines 1-14.

In another example, the driver of a vehicle may change to another lane so that the vehicle approaches a front vehicle in the another lane. In such a situation, the driver is aware of an increased contact possibility and is driving in readiness to decelerate the vehicle. According to this situation, the apparatus detects the intention of the driver to change lanes and brings the vehicle closer to the front vehicle. The apparatus delays the timing of providing contact possibility information to the driver, allowing the driver to smoothly change lanes without an unnecessary and annoying warning to the driver. Therefore, the apparatus harmonizes the intentions of a driver with the need to provide contact possibility information to the driver. See page 23, line 15, to page 24, line 5, of the present application.

Amended claim 1 recites an information providing apparatus for a vehicle that includes a contact possibility information unit, a driver intention detector, and “a controller configured to modify at least one threshold for providing the contact possibility information according to a detection result provided by the driver intention detector, wherein the controller is configured to modify the at least one threshold to delay the timing of providing the contact possibility information.” Claims 18 and 19 contain similar language. An embodiment of this feature is shown in Fig. 19, where a delay is shown in the counter torque and/or counter force for a vehicle.

Shinmura et al. discloses a control system for a vehicle that controls braking force and enhances vehicle steerability. See Shinmura et al. at col. 1, lines 64-67, col. 2, lines 1-22. Shinmura et al. discloses an electronic control unit 44 that includes a braking force left-and-right distribution control means 44b and a detection circuit 44i. See Shinmura et al. at col. 5, lines 35-65. The electronic control unit determines the relative distance to an obstacle, relative speed to the obstacle, and a contact possibility with the obstacle by comparing the relative distance to a threshold value to determine if automatic braking is needed. See Shinmura et al. at col. 6, lines 16-22, 30-38. The threshold value is determined from mapped data on the basis of the relative distance and relative speed with respect to the obstacle. See

Shinmura et al. at col. 6, lines 36-38. The braking force left-and-right distribution control means 44b includes a threshold value changing means 44e. See Shinumra et al. at col. 7, lines 19-27. When a contact possibility signal is input, the threshold value changing means 44e selects values for yaw rate error $\Delta\Theta\dot{0}$, vehicle slip angle β_0 , and steer angular velocity to initiate vehicle behavior control at an earlier stage in comparison to when a contact possibility signal is not received by the threshold value changing means 44e. See Shinmura et al. at col. 7, lines 19-38, 51-61. In other words, Shinmura et al. discloses modification of threshold values to cause vehicle behavior control at an earlier stage, rather than modification of threshold values to delay control.

Shinmura et al. does not disclose, teach, or suggest “a controller configured to modify at least one threshold for providing the contact possibility information according to a detection result provided by the driver intention detector, wherein the controller is configured to modify the at least one threshold to delay the timing of providing the contact possibility information.” Therefore, Shinmura et al. can not disclose all of the limitations required by amended claims 1, 18, and 19. Withdrawal of this rejection is respectfully requested.

Rejections under 35 U.S.C. § 103

Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Shinmura et al. in view of U.S. Patent No. 6,604,042 (hereafter “Maruko et al.”). This rejection is respectfully traversed. Maruko et al. teaches a control system in which the control system checks whether a lane-changing indicative flag LC shows the presence of a driver’s intention for lane-changing. See Maruko et al. at col. 9, lines 58-64. If the lane-changing indicative flag LC shows a presence of a driver’s intention for lane-changing (LC=1), the control routine skips the steps for preliminary-braking-control-mode, including the step for setting brake-fluid pressure in step S11. See Maruko et al. at col. 9, lines 65-67; col. 10, lines 1-15. If the lane-changing indicative flag LC does not show a presence of a driver’s intention for lane-changing (LC=0), the control routine proceeds through the steps for preliminary-braking-control-mode, including the step of setting brake-fluid pressure in step S11. See Maruko et al. at col. 9, line 67; col. 10, lines 1-15.

Maruko et al. is silent in regard to “a controller configured to modify at least one threshold for providing the contact possibility information according to a detection result provided by the driver intention detector, wherein the controller is configured to modify the at least one threshold to delay the timing of providing the contact possibility information.” Therefore, it would not have been obvious to one of ordinary skill at the time that Applicants’ invention was made to modify the system disclosed by Shinmura et al. by the teachings of Maruko et al. to make the apparatus of claims 1, 18, and 19, nor would one of ordinary skill in the art have motivation to do so. Withdrawal of this rejection is respectfully requested.

Claims 8-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shinmura et al. in view of U.S. Pub. No. 2003/0014176 (hereafter “Levine”). This rejection is respectfully traversed. Levine discloses a vehicle override system in which a throttle generated signal is divided into two components, with the first component “directed to the fuel control valve 111 to maintain the vehicle speed at its preexisting speed.” See Levine at paragraph 0049. The second component “is directed to the fuel control valve 111 after first passing through an adjustable time delay circuit 117 and an amplitude divider circuit 118.” See Levine at paragraph 0049.

Levine does not disclose, teach, or suggest “a controller configured to modify at least one threshold for providing the contact possibility information according to a detection result provided by the driver intention detector.” Levine delays the second component of a throttle generated signal when onboard sensors detect a “violation of the traffic laws or any adverse condition.” See Levine at paragraph 0049. Levine does not disclose, teach, or suggest that a threshold for determining when the time delay circuit should be used is modified. Nor does Levine disclose, teach or suggest that such a threshold is modified according to a detection result provided by a driver intention detector.

Levine does not disclose, teach or suggest a controller that is “configured to modify the at least one threshold to delay the timing of providing the contact possibility information.” Levine does not disclose, teach, or suggest that the delay caused by the time delay circuit is due to a modification of a threshold for determining when the time delay circuit should be used. Nor does Levine disclose, teach, or suggest that such a delay is due to modification of a

threshold according to a detection result provided by a driver intention detector. Therefore, it would not have been obvious to one of ordinary skill at the time that Applicants' invention was made to modify the system disclosed by Shinmura et al. by the teachings of Levine to make the apparatus of claims 1, 18, and 19, nor would one of ordinary skill in the art have motivation to do so. Withdrawal of this rejection is respectfully requested.

Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Shinmura et al. in view of Maruko. This rejection is respectfully traversed. As noted above, Maruko et al. fails to remedy the deficiencies of Shinmura et al. Withdrawal of this rejection is respectfully requested.

Allowable Subject Matter

Applicants wish to thank the Office for indicating that claims 20-23 contain allowable subject matter. Claims 20 and 23 have been amended to be placed in independent form.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

By



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